Instrumentation Papers for Polarimetry: discussion

polar. mtg.
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<u>One approach - 3 papers:</u>

- Hjet polarimeter
- pC polarimeter(s) RHIC & AGS
- Overall system & measurements, e.g.
  "Polarimetry measurements for RHIC experiments"

<u>Other papers:</u>

- Andrei's Hjet analyzing powers

This is just a first pass list of ideas

Hjet polarimeter

Measurement principle:
- Elastic scattering
- CNI asymmetry
- T invariance (?)

Hardware:
- Polarized atomic H beam, BR polarim., H_2 contam.
- Detectors
- DAQ
- Chamber, collimators, ...

Running experience:
- Coordination w/ RHIC, beam steering @ Hjet (MCR luminescence picture)
- Changes year-to-year
- Problems: pickup, backgrounds

Data analysis, results:
- Calibration(s): α-source, more?
- Signal handling (wave forms)
- Signal / backgrounds, e.g. E vs. θ relation for elastics
- Results: A_N, P_{beam} & syst. uncert.

Side studies:
- Longitudinal profiles
- ...

pC polarimeters

Measurement principle:
- Elastic scattering
- CNI asymmetry

* some topics need RHIC/AGS specific descriptions

Hardware:
- *Scattering chamber; EM sim.?
- *Targets, EM sim. & upgrade
- *Detectors (which?)
- DAQ
- Other tools: α-sources, scintillators

Running experience:
- Coordination w/ machine & expts.
- Changes year-to-year
- Problems: pickup, backgrounds, detector instabilities

Data analysis, results:
- Calibrations: α-source, banana fit$\rightarrow$(dead layer,T_0) (needs clarification)
- Signal / backgrounds, low (E,T) background
- Rate corrections (AGS)
- Asymmetry fit $\rightarrow$ (P_x,P_y) spin tilt, per-bunch asymmetries
- Polar. profile measurement
- Systematic uncertainties

Side studies:
- A_N vs. tgt. thickness
- Measurements for spin tune studies
- Scintillators: carbon vs. scint. rates (profile), beam time structure

Overall system

Accelerator constraints:
- AGS→RHIC cycle
- RHIC polarization properties: dP/dt, polarization profile

Experimental needs:
- Longitudinal/transverse polar., polarimeters only transverse P
- Single/double spin asymmetries
- Spin patterns
- Polarization profile
  → colliding bunch polarizations

Polarimeter information:
- Hjet long term P scale
- pC frequent relative P, dP/dt, profile
- pC/Hjet normalization, spin tilt correction

Results for experiments:
- Polarization for single spin asym.: fill-by-fill P_0, dP/dt
- $P_{SSA} \rightarrow P_{DSA}$
- Systematic uncertainties: scale, ...

Going forward

- This is just a first pass list of ideas
- Highly incomplete / overcomplete
- Please contribute
- Old pictures, figures highly desired
- Old workshop writeups helpful
- Volunteers?